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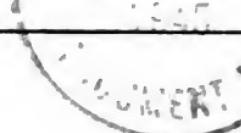
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FM 24-75

WAR DEPARTMENT FIELD MANUAL



TELEPHONE SWITCHBOARD

OPERATING PROCEDURE

WAR DEPARTMENT • NOVEMBER 1944

WAR DEPARTMENT FIELD MANUAL
F M 24 - 75

*This manual supersedes Tentative FM 24-75, Telephone Switchboard
Operating Procedure, 30 October 1943.*

**TELEPHONE SWITCHBOARD
OPERATING PROCEDURE**



WAR DEPARTMENT • NOVEMBER 1944

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FM 24-75, Telephone Switchboard Operating Procedure, is published for the information and guidance of all concerned.

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327.

For explanation of symbols, see FM 21-6.

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CHAPTER I

TELEPHONE SWITCHBOARD OPERATOR

- 1. GENERAL.** The primary responsibility of a telephone switchboard operator is to provide telephone service of a uniformly high standard, with the least possible delay, confusion, or annoyance to telephone users. The competent operator is thoroughly familiar with all the aspects of his job, knows exactly what is expected of him, and performs his functions with *courtesy, accuracy, and speed*. He must be intelligent, efficient, able to speak distinctly and to understand speech over the telephone readily, and capable of working for prolonged periods under stress. He must be familiar with Army organization, and be able to read traffic and circuit diagrams. In addition to his operating functions, he keeps the station log and traffic diagram up-to-date. The operator may also be called upon to help install and maintain his switchboard and install short locals. This manual prescribes correct telephone switchboard operating procedure.
- 2. COURTESY.** Tone and manner of speaking, more than anything else, determine the impression an operator makes in a telephone conversation. A pleasant tone of voice, unfailing courtesy, tact, and concentrated attention to the wishes of the caller create a favorable impression and promote maximum efficiency of service.
- 3. ACCURACY.** Mistakes are usually due either to misunderstanding or to carelessness on the part of the operator or the telephone user. Such mistakes increase the operator's burden of work, antagonize users, and cause dissatisfaction. The operator can improve his accuracy by exercising care in putting

up connections and ringing; by listening attentively; by speaking and enunciating distinctly; and by giving close attention to supervisory signals.

4. SPEED. Speed is one of the most important requirements of telephone service. It depends largely upon the operator's skill and accuracy in making connections. Speed can be acquired only by practice and a systematic effort to eliminate all unnecessary movements. Mere haste will not result in an increase in speed. Concentrate on the easy execution of each operation, with the least possible expenditure of energy, but without loss of time.

5. SECRECY. a. Conversations conducted over the connections which the operator establishes on his switchboard are the concern of the talking parties *only*. Many of these conversations will involve information which the enemy would like to obtain.

b. In order for the operator to avoid becoming a link in the chain by which the enemy may receive such information, he must listen to *no* calls, even in slack periods, except for the momentary intervals absolutely necessary for supervision. If the operator does not become familiar with valuable information, he will not be in danger of passing it on.

c. Any information which the operator acquires during the operation of his switchboard, except that related to line and traffic conditions, should be treated as confidential. No matter how trivial it may seem, this information should not be mentioned to anyone, *not even fellow operators*.

6. DEFINITIONS. The following definitions of terms commonly used in telephone switchboard operation should be thoroughly understood by all operators:

a. Answering cords, on multicord switchboards designed by the Army, are the cords in the rear row (furthest from the operator), used to answer incoming calls.

b. Automatic trunks are wire circuits between switchboards, so engineered that the insertion of a plug into the trunk jack at one switchboard automatically signals the distant switchboard.

c. Calling cords, on multicord switchboards designed by the Army, are the cords in the front row, used to complete a connection and signal a called party.

d. Challenging is the practice of an operator asking the subscribers on a connection whether further service or termination of the connection is desired, usually after a supervisory signal has been received.

e. Circuit diagrams are illustrations in symbol form of the technical arrangements and connections of a wire system.

f. Common battery circuits are telephone circuits in which both transmitting and signaling current are supplied from a central or common source, usually at the central office in which the switchboard is located.

g. Grouping keys are keys or switches used to connect the cord circuits of an unattended position or switchboard with the operator's circuit of an attended position or switchboard, enabling one operator to control and use the cords of both positions or switchboards.

h. Line drops are electrically operated visual signals on a switchboard, used to indicate incoming calls on local battery lines and trunks. On some switchboards line drops are also used as supervisory drops.

i. Line lamps are small lamps used on common battery switchboards to indicate incoming calls.

j. Line loss is the decrease in the strength of electrical signals as they pass through a wire line. In the case of a telephone line, this loss results in a decrease of volume of sound to the listener. The switchboard operator may minimize this loss by routing long distance calls in such a manner that they pass through as few switchboards as possible, and by supervising long distance calls as little as possible, since supervision increases the loss.

k. Locals are wire circuits connecting telephones to switchboards or to other telephones.

l. Local battery circuits are telephone circuits in which each telephone or switchboard supplies its own current for talking. Since magnetos supply the ringing current for local battery circuits, the term *magneto* is sometimes substituted for local battery in referring to such circuits.

m. **Magneton** are hand-operated generators used to supply the alternating current to operate telephone ringers and switch-board line drops. Magneton supply the means for signaling for local battery telephones, and for that reason such instruments sometimes are referred to as magneto telephones.

n. **Monocord** switchboards are telephone switchboards in which each line terminates in a jack, line drop, and cord.

o. **Multicord** switchboards are telephone switchboards in which each line terminates in a jack and line drop or a jack and line lamp. Lines are interconnected by means of cord circuits, each of which includes an answering cord and a calling cord.

p. **Multiple** switchboards are multi-position switchboards in which each line makes a jack appearance at several positions, so that each operator has easy access to a jack for every line.

q. **Multi-position** switchboards are switchboards designed for simultaneous operation by two or more operators working at separate panels. A multi-position switchboard may be a multiple board or a group of individual switchboards connected by inter-position trunks.

r. **Night alarms** are bells or buzzers used to indicate incoming calls and, sometimes, supervisory signals. They serve to alert an operator during slack periods when he is not in close attendance at his position.

s. **Patching** is the practice of temporarily connecting two circuits through some device other than a regular switchboard cord circuit. A cord terminating at each end with a plug is frequently used for this purpose. Such a cord is referred to as a *patching* cord.

t. **Recall lamps** are small lamps used on combined common and local battery switchboards to indicate that a subscriber on a local battery line is ringing off or recalling.

u. **Ringdown trunks** are wire circuits between switchboards, so arranged that to signal the distant switchboard it is necessary to ring on the circuit.

v. **Supervision** is the practice of watching over the condition of a connection at a switchboard to determine when additional

service is required or when subscribers are through using the connection.

w. **Supervisory drops** are electrically operated visual signals on local battery switchboards, used to indicate ring-off and recalls. Line drops sometimes are used as supervisory drops.

x. **Supervisory lamps** are small lamps used on common battery switchboards to indicate that a subscriber has hung up or is recalling.

y. **Switchboards connected in multiple** are two or more switchboards placed side-by-side and so interconnected that each line makes an answering jack appearance at one board and a multiple jack appearance at two or more boards, so that one man can operate all the boards during slack periods.

z. **Switchboards connected in parallel** are two or more switchboards placed side-by-side and so interconnected that each line makes only one jack appearance. One man can operate these boards during slack periods, but to complete a call he must stretch a calling cord from the switchboard on which the call originated to the switchboard on which the called party's jack is located.

aa. **Traffic diagrams** are charts showing the number of telephone channels actually existing between the switching centrals of a telephone system. Long locals are also shown.

CHAPTER 2

PROCEDURE COMMON TO ALL SWITCHBOARDS

Section I. FUNDAMENTAL PROCEDURE

7. GENERAL. a. All switchboards are alike in many respects. The cords, keys, line jacks, and trunk jacks are always arranged to work in a basically similar fashion. Nevertheless, each switchboard has its own peculiarities with which the operator should become familiar. Some of the features of switchboard operation which the operator must understand thoroughly are given below. Others may be added to this list by the chief operator or the signal officer.

- (1) Functions and uses of auxiliary keys and other auxiliary controls.
 - (2) Use of trunk circuits. Operators must know which circuits are automatic and which are ring-down.
 - (3) Order of preference among trunks to other switchboards.
 - (4) Limitations on the use of commercial toll services.
 - (5) Limitations on calls outside the Army system from local telephones.
 - (6) Use and care of operator's telephone sets.
 - (7) Other special operating instructions.
- b. The names and locations of typical switchboard features are indicated in figures 1, 2, 3, 4, and 5.

8. LINE AND TRUNK SIGNALS. When a subscriber wants a signal the operator, he either lifts the receiver

of a common battery telephone or cranks the generator on a local battery telephone. In the first case, the operator is signaled by the lighting of the line lamp. In the case of the local battery circuit, he is signaled by the falling of a drop shutter. The same signals in connection with a trunk circuit indicate an incoming call from another switchboard.

9. JACKS AND THEIR USES. Each line and trunk circuit connected to a switchboard terminates in one or more jacks. Associated with each answering jack is a drop or lamp which indicates incoming calls on that particular circuit. By use of these jacks, circuits are interconnected and calls are completed.

10. CORDS AND THEIR USES. Interconnections between lines and connections from line to trunk or from trunk to line are completed by means of cords. On a monocord switchboard there is one cord for each line or trunk, and connections are made by plugging one party's cord into the other party's jack. On a multicord switchboard the cords are not associated directly with the line and trunk circuits, but are plugged into the line or trunk jacks as connections are desired. Each cord circuit on a multicord switchboard includes a calling cord and an answering cord, arranged in rows on the key shelf. On Army designed multicord switchboards, the cords in the rear row are the answering cords. Use them to answer all calls. Use the corresponding front cord of a pair of cords to complete the connection to the called party. On these switchboards the operator cannot ring on the answering cord.

11. TECHNIQUE OF HANDLING CORDS. When inserting or removing cords, always grasp the shell of the plug, never the cord itself. This reduces wear and helps to prevent cord troubles, develop the habit of grasping the plug between the thumb and the index finger. This helps guide the plug into the jack and permits the withdrawal of the plug without disturbing adjoining connections.

a. When inserting a plug into a jack, hold the plug in a diagonal position, pointed downward and into the jack. This

makes it possible to watch the tip of the plug enter the jack, and there is less danger of making a wrong connection. If it is necessary to make a busy test, move the plug diagonally downward across the jack until the tip of the plug hits the sleeve of the jack on the opposite side. If a click is heard in the headset as this contact is made, the line is busy, and the calling party should be so informed. If no click is heard, turn the plug so that it enters straight into the jack, and seat it firmly.

b. In tracing cords, the hand as well as the eyes should be used. The best method is to slacken and tighten the cord a little, making sure it is the one wanted by watching the movement of the cord. This avoids cut-offs resulting from disconnection of the wrong cord. On some Army switchboards, colored cords are used to provide a visual aid in tracing cords.

12. KEYS AND THEIR USES.

a. Keys are used on most switchboards, and serve three general purposes:

- (1) Ring keys are used to signal on a line or trunk.
- (2) Talk-listen keys are used to connect the operator's circuit to a cord circuit being used to complete a connection, so the operator may talk or listen on that connection.
- (3) Auxiliary keys are used for a variety of special switching purposes, and different types are found on different boards.

b. Frequently the ring and talk-listen keys are combined into a *talk-ring* key. This type of key functions as a ring key when operated in one direction and as a talk-listen key when operated in the opposite direction. The talk-listen and ring key (or keys) associated with any cord circuit is placed directly in line with the cords of that circuit.

13. ANSWERING CALLS.

On monocord switchboards, the talk-listen key associated with the calling party's line is operated to connect the operator's circuit with that line. On multicord switchboards, the talk-listen key that is next in the order of rotation is operated and the associated answering cord is plugged into the calling party's jack. The operator may then answer and hear the calling party.

14. RINGING. Generally, when an operator plugs a calling cord into the called party's jack, he operates the ring key for that cord immediately, using the hand which did not insert the plug. Ring steadily for 3 seconds. Repeat every 10 seconds, as nearly as possible, until the called party answers. Progress reports must be given as required. If no answer is received, advise the calling party of that fact before disconnecting. On local battery lines, operate the listening key between ringing periods to determine whether or not the called party has answered.

15. PROGRESS REPORTS. When completion of a call is delayed, the operator should give progress reports at regular intervals of about 60 seconds, to indicate that he is trying to complete the call as quickly as possible. The calling party will appreciate this service and will be encouraged to wait. In every case, the operator should wait long enough to allow the calling party to acknowledge the report or to change his call. The only way the calling party knows that his call is receiving attention is through progress reports.

16. BUSY CALLS. a. If a called line on the operator's switchboard is busy, he will advise the calling party by saying: "(Telephone number) is busy." Except under extraordinary circumstances, only one attempt will be made to complete a call on a busy line. Disconnect as soon as the calling party has accepted the busy report.

b. In case all trunks to the called switchboard are busy, inform the calling party by saying: "(Name of called switchboard) is busy."

17. SLOW ANSWER AND "DON'T ANSWER" CALLS. When the called party does not answer within 60 seconds, report to the calling party by saying: "(Telephone number) does not answer." Ordinarily, no further attempt will be made immediately to call the number which has not answered. Where local operating practice and traffic conditions permit, the signal officer or chief operator may authorize an additional minute of ringing on slow answer and "don't answer" calls. In this case, report after the first 60 seconds:

"I am ringing (telephone number)." Ring for another 60 seconds, and at the end of the second minute report: "(Telephone number) does not answer." The calling party may choose to hang up and try the same number again later, or he may ask for another number at which the called party might be reached.

18. DISCONNECTIONS. **a. Common Battery.** On an Army designed common battery switchboard, the operator is notified that a conversation has been completed by the lighting of supervisory lamps in front of the cords in use. If both lamps light, take down the connection promptly. This can be done as an overlapping operation, while the operator is talking or ringing on other circuits. If only one lamp lights, the operator must supervise the connection to learn whether the other party wants additional service. To do this, operate the talk-listen key and challenge by saying: "Have you finished?" Pause, then repeat the challenge. Listen, and if no answer is received, take down the connection.

b. Local Battery. If a switchboard contains local battery circuits, either supervisory drops or recall lamps may be used to indicate the termination of calls on such circuits. When a supervisory signal is received, operate the talk-listen key, and challenge the connection as explained in subparagraph *a* above before taking down the cords. The recall lamps do not remain lighted and must be watched very carefully. It is necessary to supervise all local battery calls at frequent intervals to determine when conversation has ceased. Users sometimes forget they are supposed to ring off. Whenever an operator hears no conversation over cords still connecting parties, he should challenge the connection before taking down the cords.

c. Connection Through Ring-down Trunk. If the connection to be taken down has been established through a ring-down trunk, clear the trunk before disconnecting. Clearance may be initiated by whichever operator first ascertains that the connection is no longer required. He will ring on the trunk, substituting the calling cord for the answering cord if necessary. The distant operator on that trunk will challenge, as described above, and the operator who rang will

say: "Clear to (name of his switchboard)." The distant operator will answer: "Clear to (name of his switchboard)."

19. ORDER OF ATTENTION TO SIGNALS. Answer all calls promptly in the order of their appearance. Special priority may be assigned to certain telephones or trunks. Calls in which these preferred service telephones or trunks are involved are excepted from the above rule and are given priority over all other calls. Occasionally, signals of different kinds will appear at the same time, and it will be necessary for the operator to decide which signal should be answered first. In such cases, give the signals attention in the following sequence:

a. **Incoming Trunk Signal.** There are relatively few trunks, and they must be used with maximum efficiency. Delay in completion of a trunk call not only keeps other calls off that trunk, but monopolizes the attention of one or more other operators.

b. **Flashing Supervisory Signal.** In this case, one or both parties are awaiting the operator's attention, and the operator in question is the only one who can answer the signal. Supervise the connection by saying: "(Name of your switchboard) operator." Flashing supervisory signals on calls involving preferred service telephones are answered before incoming trunk signals.

c. **Line Signal.** Line signals should be answered next.

d. **Local Battery Supervisory Signals.** These may be recall signals and should be challenged promptly. Supervisory signals on cords connected to trunks should receive attention first.

e. **One-lamp Disconnection.** This signal indicates that one party may require additional service, even though the original call is terminated.

f. **Two-lamp Disconnection.** This indicates that both parties have finished and that the connection should be taken down. This may be done as an overlapping operation. However, disconnections should be made as promptly as possible so the lines and equipment involved will be available for use on other calls.

20. OPERATING TECHNIQUES COMMON TO ALL TYPES OF CALLS. a. Have the key operated to the talking position before plugging in to answer any call. Answer immediately with the name of your switchboard, as: "Dexter operator."

b. If there is no response to the answering phrase, repeat it. If there is still no answer, remove the plug and reinsert it.

c. Never plug into a jack until ready to answer and handle the call.

d. Have only one key operated to the talking position at a time. More than one key in this position may cause a double connection, resulting in crosstalk.

e. Listen attentively to the order and acknowledge by repeating the called number, as: "Dandy one one." Never fail to acknowledge an order.

f. If you do not understand an order, ask to have it repeated by saying: "What number, please?" Such requests must be kept to an absolute minimum.

g. While obtaining and acknowledging the order, pick up the cord to be used in completing the call and be ready to complete the connection quickly.

h. When in doubt about the status of any call on the board, supervise the call for a brief period. If no conversation is heard, challenge the connection by saying "Have you finished?" (pause) "Have you finished?" Proceed as instructed if you receive an answer. If no answer is received, remove the connections.

i. Refer all unusual requests, particularly those involving lengthy explanations of controversial questions, to the chief operator or signal officer. Avoid arguments with users by referring them courteously to the chief operator.

j. For a list of operating phrases prescribed for use by switchboard operators in all cases where they apply, see FM 24-20. These phrases are to be used to the exclusion of all others of similar meaning.

Section II. TYPES OF CALLS

21. CALL FROM LINE TO LINE. This is the simplest type of call the operator will have to handle. It requires no

special instructions in addition to those given in the preceding paragraph.

22. CALL FROM LINE TO ARMY TRUNK. a. When a party is to be reached over an Army trunk, select the first idle trunk, in the order of preference. Ring for 3 seconds. Wait until the distant operator answers, then pass the call by repeating the desired number in full, as: "Magic one one." Continue to supervise the call at frequent intervals until assured that the called party has answered. If traffic conditions permit, supervise the call continuously until the called party answers. Completion of a call is the responsibility of the operator at the point of origin.

b. If it is impossible to complete the connection over the first or regular route, try any alternate routes available. If all trunks are busy, inform the calling party by saying: "(Name of called switchboard) is busy."

c. After the connection has been established, challenge a one-lamp disconnect, supervisory drop, or recall lamp signal, as usual. If the distant operator is heard challenging, say: "Clear to (name of own switchboard)." If no reply is received from the distant operator, ring, and when the distant operator answers, say: "Clear to (name of own switchboard)."

d. Some switchboards may be combination switchboards, containing several long distance circuit terminations as well as local circuits and relatively short trunks. In this case, the additional practices described in chapter 5 should be applied in handling outgoing calls over the long distance circuits.

23. CALL FROM LINE TO COMMERCIAL TRUNK—LOCAL CALL. a. Calls of this type will be completed only from authorized telephones.

b. If the commercial central office is manually operated, plug into the first idle trunk, in the order of preference, and ring if necessary. When the commercial operator answers, pass the call by repeating the desired number in full. It is necessary to supervise this type of call closely because in most cases no disconnect signal will be received over the commercial trunk. Close supervision also is necessary to pre-

vent the placing of an unauthorized call after the completion of the initial call.

c. If the commercial central office is dial automatic, it will usually be necessary for the operator himself to dial all numbers. Any exceptions to this rule will be made by the chief operator or the signal officer. It is not necessary to supervise this type of call, except to listen for the ringing or busy tone.

24. CALL FROM LINE TO COMMERCIAL TRUNK—TOLL CALL. No standard practices can be established for the handling of toll calls, since such practices must be co-ordinated with the commercial (or governmental) system from which this service is obtained. The signal officer will issue special instructions concerning this type of call (see ch. 5).

25. CALL FROM ARMY TRUNK TO LINE. a. On calls of this type, answer with the name of the switchboard, as: "Cactus operator." Acknowledge the call by repeating the called number, as: "Cactus six." Locate the jack of the called party, plug in, and ring as usual. Give progress reports, busy reports, etc., as for a local call.

b. Challenge a one-lamp disconnect or recall lamp signal, as usual. If the distant operator is heard challenging, say: "Clear to (name of own switchboard)." If no reply is received from the distant operator, replace the answering cord with the calling cord, ring, and when the distant operator answers, say: "Clear to (name of own switchboard)." This cord exchange is necessary when it is not possible to ring with an answering cord.

26. CALL FROM ARMY TRUNK TO ARMY TRUNK. a. On calls of this type, proceed as instructed by the originating operator. Always select the most direct route, if the originating operator does not specify a route for the call.

b. Select the first idle trunk in order of preference, and ring if necessary. Keep the listening key thrown, and when the operator at the called switchboard answers, pass the call by repeating the desired number in full.

c. If all trunks, including all alternate routings, to the called switchboard are busy, report this fact by saying: "(Name of called switchboard) is busy." When the originating operator has acknowledged the report, remove the plug.

d. Supervise these connections frequently. If the switchboard is equipped with a monitor key, use this key when supervising. Challenge as usual if no conversation is heard. The distant operators in each direction should ring to clear the circuit. Upon receipt of this signal, challenge: "Have you finished?" (pause) "Have you finished?" If a distant operator reports the trunk clear at his switchboard, add the phrase: "Clear to (name of own switchboard)." Both trunks must be cleared before the connection is taken down.

27. CALL FROM ARMY TRUNK TO COMMERCIAL TRUNK. Calls of this kind (both local and toll) are handled like those originating on the operator's own switchboard. Special instructions, depending upon local conditions, will be issued to the operator concerning the holding or releasing of Army trunks in the event that toll calls are delayed.

28. CALL FROM COMMERCIAL TRUNK TO LINE—LOCAL CALL. This type of call requires no special instructions. Proceed in accordance with instructions common to all calls.

29. CALL FROM COMMERCIAL TRUNK TO LINE—INCOMING TOLL CALL. a. Prepaid Calls. Establish the connection with the called party as quickly as possible. On person-to-person calls, when the called person cannot be located in a short time, advise the long distance operator accordingly. Suggest the names of available persons who can talk in place of the called person. If the call cannot be completed in this way, try to find out when the desired person will be available, and notify the long distance operator.

b. Delayed Calls and Collect Calls. No standard practices can be established for the handling of these calls, since such practices must be coordinated with the commercial (or governmental) system from which the service is obtained.

The signal officer will issue special instructions covering such calls (see ch. 5).

30. CALL FROM COMMERCIAL TRUNK TO ARMY TRUNK. On calls of this type, the operator proceeds as in the case of calls which can be completed on his own switchboard. He will probably receive special instructions from his chief operator or signal officer concerning the holding of Army trunks, should the call be delayed. These instructions will depend on the number of trunks available and the frequency with which they are used.

31. URGENT CALLS. a. The operator may be called upon to handle calls which have been given urgent precedence by proper authority. Such calls may originate at the operator's switchboard, or may come in on trunks. If the called party is busy, interrupt any call which is not an urgent call. Operate the listening key and say: "I must interrupt. Urgent call for (name of switchboard and telephone number)." Then take down the original connection, put up the urgent connection and say: "Go ahead, please." If all trunks to the called switchboard are busy, select one not carrying an urgent call, operate the listening key, and say: "I must interrupt. Urgent call for (name of switchboard and telephone number). Please hang up." Then ring on the trunk and pass the urgent call to the distant operator. Since the enemy may be listening, do not reveal the identity of the subscriber originating the urgent call to the parties whose call is interrupted.

b. Urgent calls are reserved for reports of initial contact with the enemy, initial amplifying reports, subsequent contact reports, calls for field artillery fire missions, and other messages during actual or imminent combat which may materially affect plans or the course of action. Therefore, they must be completed at the earliest possible moment.

c. An urgent call can ordinarily be placed only by certain members of a command. It is the duty of every operator to know who is authorized to place urgent calls. A system of authenticators, locally established, may be used to insure that urgent calls are not placed by unauthorized personnel. In emer-

gencies, personnel not specifically authorized to place urgent calls may do so. In such instances, the operator will record the calling party's name, the numbers of the calling and called locals, and the time, and report this information to the chief operator. Only urgent calls warrant the interruption of connections which have already been established and on which conversation has started.

32. CONFERENCE CALLS. At some headquarters, all conference calls will be handled by the chief operator or a supervisor. Frequently, however, such calls are handled by the operator who receives the initial request. The following procedure will be followed by the personnel responsible for handling conference calls in either instance.

a. Setting Up Conference Calls. When a user wants to place a conference call, he says: "Conference call," and tells the operator the telephone numbers of all parties with whom he wants to be connected, his own designation, and whether he prefers to wait for the call or to be called back when the connection is established. The exact procedure for completing the call will vary with the switchboard in use, but the steps to be followed in setting up the conference connections are as follows:

(1) Call each party, in the order in which the numbers were given by the originator of the conference. As each person answers, say: "Conference call from (telephone number or designation of calling party). One moment please." On a multicord switchboard, plug the other cord of the pair into the conference circuit. On most monocord switchboards, make the conference connections by plugging the originating party's cord into the first called party's jack, the first called party's cord into the second called party's jack, and so on.

(2) Make a second attempt to complete the connections to any numbers which tested busy during the first attempt.

(3) When assured that all available parties are connected to the conference circuit, recall the originating party, if necessary, and connect him to the conference circuit. When he answers, say: "On your conference call, we are ready. Go ahead, please."

(4) If all the desired parties are not on the conference circuit, report any omissions and, if possible, the reason therefor. The originating party may issue supplementary instructions concerning these parties. Carry out such instructions promptly.

(5) Supervise and disconnect the call in the usual manner.

b. **Scheduled Conference Calls.** (1) In placing a conference call, the user may specify some later time at which the conference is to begin. The purpose of this, usually, is to make it possible for the desired parties to be informed in advance, so that they may be near a telephone at the scheduled time.

(2) In handling a call of this type, call all the desired parties. Inform each party that a conference call in which he is expected to participate has been scheduled, giving the time and the designation or telephone number of the calling party. Ask each party for the telephone number at which he may be reached at that time. Record these for later reference. Try to reach all the desired parties, or leave word for them. At the scheduled time, establish the call in the usual manner.

Section III. DETAILED PROCEDURE.

33. DETAILED PROCEDURE. The following detailed procedure for the specified circumstances will be used on all types of switchboards. Circumstances requiring different procedure for monocord and multicord switchboards will be treated in chapters 3 and 4.

a. **Answering Call and Hearing No Number.** An incoming call is answered in the normal manner.

Operator: "Dexter operator."

No response is heard.

Operator: "Dexter operator."

If a number is received, complete the call as usual. If there is still no response, repeat:

Operator: "Dexter operator."

If there is no answer to this, check the talk key and the operator's transmitter switch to see that both are operating properly. Blow into the transmitter while alternately operating

the talk key to the talk position and restoring it to normal. Side-tone should be heard in the receiver while the key is in the talk position, but not when it is restored to the normal position. If the transmitter does not test satisfactorily, replace the head and chest set. If the trouble occurs three times in succession on the same line, and the transmitter is found to be operating satisfactorily, report trouble on the line. If it occurs three times in succession on different lines, report trouble at the switchboard.

b. Answering Call and Failing To Understand Number.
An incoming call is answered.

Operator: "Dexter operator."

Calling party: "Mumble-mumble."

Operator: "What number, please?"

Calling party: "Mumble-mumble."

Operator: "What number, please?"

Calling party: "Mumble-mumble."

Operator: "I do not understand you. I will report trouble on the line."

If the number is understood when it is repeated, complete the call in the usual manner.

c. Called Line Is Busy. An incoming call is answered.

Operator: "Dexter operator."

Calling party: "Dexter six."

Operator: "Dexter six."

Dexter six appears to be busy, but the operator supervises the connection to make certain.

Operator: "Dexter six is busy."

If the request is for a trunk call and all the required trunks are in use, report after supervising that the switchboard of the called party is busy. If the call were from Dexter six to Cactus seven, and the trunk from Dexter to Beaver, an intermediate switchboard, were busy, the Dexter operator would report:

Operator: "Cactus is busy."

d. Called Party Does Not Answer. If the called party does not answer the first signal, ring again. The standard signal is a 3-second ring every 10 seconds. Ring for 1 minute. If the called party does not answer, report:

Operator: "Dexter six does not answer."

On a trunk call, when another central does not answer on any of the connecting trunks, report always that the switchboard of the called party does not answer; the calling party might not understand a reference to an intermediate switchboard which does not answer.

e. Answering Call—Cut-off Report. An incoming call is answered.

Operator: "Dexter operator."

Calling party: "I was cut off."

Operator: "What number were you calling, please?"

Calling party: "Dexter one zero."

Operator: "Dexter one zero."

Complete the call in the normal way.

f. Answering Call — No Telephone at Number Called.
An incoming call is answered.

Operator: "Dexter operator."

Calling party: "Dexter one five."

Operator: "Dexter one five has no telephone now. I can give you Dexter one one."

Then complete the call to Dexter 11. When for any reason there is no telephone at the called number, the operator suggests a substitute telephone at which the calling party can reach the person desired or obtain the information he wants. This may be the message center telephone, the public telephone, when attended, or any telephone located near the called party's dugout, tent, or office. In case of doubt, the operator refers the call to the chief operator, who will suggest the number of a telephone convenient to the called party.

g. Answering Call—Called Telephone Is Out of Order.
An incoming call is answered.

Operator: "Dexter operator."

Calling party: "Dexter one three."

Operator: "Dexter one three is out of order. I can give you Dexter one one."

Then complete the call to Dexter 11. Calls to telephones which are out of order are handled similarly to the procedure explained in f above.

h. One Calling Party Requesting Another Called Party.

Incoming calls are received simultaneously from Dexter 10 and Dexter 11. The call from Dexter 10 is answered first.

Operator: "Dexter operator."

Dexter ten: "Dexter one one."

Operator: "Dexter one one, one moment, please."

Return the key on this connection to normal and answer the call from Dexter 11.

Operator: "Dexter one one, will you accept a call from Dexter one zero?"

Dexter eleven: "Yes."

Connect the two parties with the cord circuit associated with Dexter 10.

Operator: "Go ahead, please."

The second party may refuse the call.

Dexter eleven: "No, I want Dexter six."

Operator: "Dexter six."

Complete the call from Dexter 11 to Dexter 6, then report to Dexter 10:

Operator: "Dexter one one is busy."

i. **Supervising Connection—Called Party Has Not Answered.** After supervising a connection and hearing nothing, challenge.

Operator: "Have you finished?"

Calling party: "They haven't answered yet."

Operator: "I will ring again."

Ring the called party in the standard manner.

j. **Supervisory Signal—Recall—Wrong Number.** Challenge after a supervisory signal.

Operator: "Have you finished?"

Calling party: "I was given the wrong number."

Operator: "What number were you calling, please?"

Calling party: "Dexter six."

Operator: "Dexter six."

Take down the connection and complete the call to the proper party.

k. **Urgent Call.** An incoming call is answered.

Operator: "Dexter operator."

Calling party: "Urgent call for Dexter six. This is S-3."

Operator: "Dexter six. Urgent Call."

Urgent calls must be connected immediately. If the called line is busy, interrupt:

Operator: "I must interrupt. Urgent call for Dexter six."

Then remove the original connection and connect the calling party to Dexter six.

Operator: "Go ahead, please."

If the urgent call must be completed through another switchboard and all trunks are busy, interrupt on a trunk not already carrying an urgent call.

Operator: "I must interrupt. Urgent call for Cactus six. Please hang up."

Then ring the distant operator.

Beaver operator: "Beaver operator."

Dexter operator: "Urgent call for Cactus six."

Beaver operator: "Cactus six. Urgent call."

Supervise until the call is completed.

CHAPTER 3

MONOCORD SWITCHBOARD OPERATING PROCEDURE

34. GENERAL. Signal Corps personnel are frequently called upon to operate monocord switchboards at many locations within division, corps, army, and theater areas. Monocord switchboards in general use by the Army are Switchboards BD-71 and BD-72, BD-9 and BD-11 and SB-5/PT.

35. SWITCHBOARDS BD-71 AND BD-72. Switchboards BD-71 and BD-72 are portable, monocord, magneto-telephone switchboards used primarily in field wire systems. The capacity of the BD-71 is 6 lines and that of the BD-72 is 12 lines; the BD-72 is therefore longer and heavier. Except for the difference in the amount of line equipment, these switchboards are identical. Operation of these switchboards is explained in TM 11-330, Switchboards BD-71, BD-72, BD-72-A, and BD-72-B. The following detailed procedure is used:

a. **Local Call.** When a drop-shutter falls, depress the associated talk-ring key to the talk position.

Operator: "Dexter operator."

Pick up the associated cord in the left hand.

Calling party: "Dexter six."

Operator: "Dexter six."

Return the first key to normal, raise the key of Dexter six to the ring position with the left hand, and turn the generator handle with the right hand. Then depress the key to the talk position, and plug the cord into the Dexter six jack. When

conversation begins, return the key to normal, and restore the calling party's drop-shutter.

Caution: Be sure to restore the calling party's key before ringing the called party. With the calling party's key and drop-shutter both down, operation of the generator will result in ringing back into the calling party's ear.

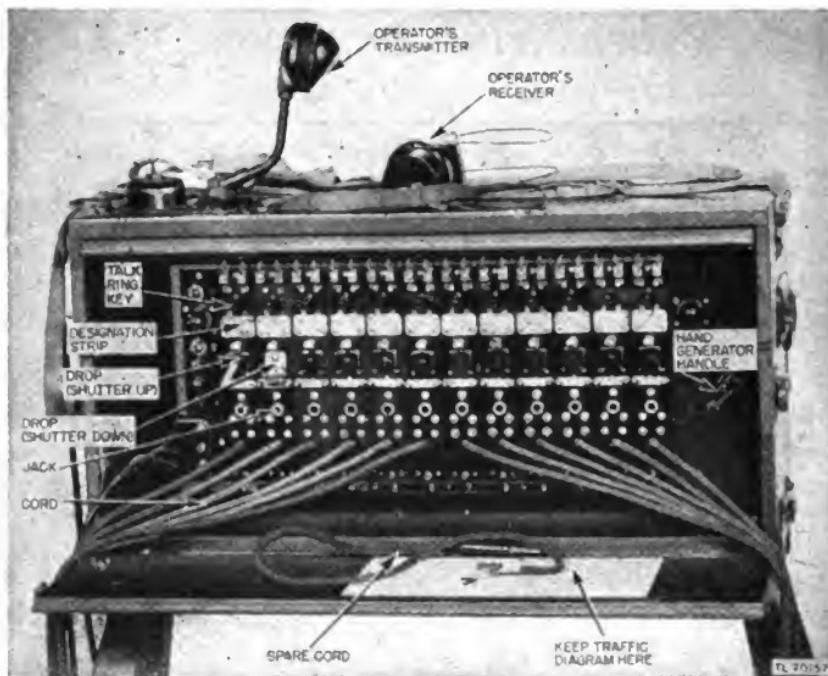


Figure 1. Switchboard BD-72.

b. Outgoing Trunk Call. When a drop-shutter falls, depress the associated talk-ring key to the talk position.

Operator: "Dexter operator."

Pick up the associated cord.

Calling party: "Ambrose six."

Operator: "Ambrose six."

Return the first key to normal and consult the traffic diagram or route bulletin. Select the proper trunk, ring on it, depress the key to the talk position, and plug the calling party's cord into the trunk jack.

Cactus operator: "Cactus operator."

Dexter operator: "Ambrose six."

Cactus operator: "Ambrose six."

Listen to make sure that the call is completed properly. The Cactus operator returns the first key to normal, rings on the Ambrose trunk, depresses the key to the talk position, and plugs the cord from the Dexter trunk into the Ambrose trunk.

Ambrose operator: "Ambrose operator."

Cactus operator: "Ambrose six."

Ambrose operator: "Ambrose six."

The Cactus operator returns the key to normal and restores the drop-shutter. The Ambrose operator will complete the call in the normal way. The Dexter operator will supervise at frequent intervals until assured that the called party has answered.

c. **Supervision.** After a connection has been established, supervise frequently to determine whether it is still in use. If nothing is heard, challenge:

Operator: "Have you finished?"

If there is no response, repeat:

Operator: "Have you finished?"

If there is no response to the second challenge, trace the cord by hand and take down the connection. If one of the connected lines is a trunk, and the distant operator is heard challenging, report:

Operator: "Clear to Dexter."

If the distant operator is not heard, ring off on the trunk and, when he answers, report:

Operator: "Clear to Dexter."

d. **Supervisory Signal—Ring-off.** When the parties have completed their conversation, both should ring off. The ring-off signals operate the drop-shutter associated with the original calling party's line. Depress the associated key to the talk position and challenge:

Operator: "Have you finished?"

If there is no response, repeat:

Operator: "Have you finished?"

If there is no response to the second challenge, trace the cord by hand and take down the connection. If one of the

connected circuits is a trunk, clear it as described in c above.

e. **Supervisory Signal—Recall—New Number Wanted.** When the cord of one line circuit is plugged into the jack of another line circuit, a supervisory signal is indicated by the falling of the drop-shutter of the first line. Upon receipt of such a signal, challenge:

Operator: "Have you finished?"

Calling party: "I want Dexter one zero."

Operator: "What number is calling, please?"

Calling party: "Dexter one one."

Operator: "Dexter one one calling Dexter one zero."

Disconnect the old call and complete the new call.

f. **Conference Call.** A drop-shutter falls and is answered.

Operator: "Dexter operator."

Calling party: "I want a conference call with Dexter five and Dexter three."

Operator: "Dexter five and Dexter three. Who is calling please?"

Calling party: "The commanding officer."

Operator: "I will call you back."

Calling party: "All right."

Restore the key to normal and ring Dexter five.

Dexter five: "Dexter five, executive officer speaking."

Operator: Conference call from the commanding officer; one moment please."

Return the key to normal, plug the calling party's cord into the Dexter five jack, then ring Dexter three.

Dexter three: "Dexter three, S-3 speaking."

Operator: "Conference call from the commanding officer. One moment, please."

Return the key to normal and plug in the cord of Dexter five. Since the party originating the conference call has hung up, call him back.

Calling party: "Dexter six, commanding officer."

Operator: "On your conference call, we are ready. Go ahead, please."

If the calling party had elected to wait on the line, the operator would merely depress the proper key and report:

Operator: "On your conference call, we are ready. Go ahead, please."

36. SWITCHBOARDS BD-9 AND BD-11. Switchboards BD-9 and BD-11 are identical in design except for line capacity; the BD-9 accommodates 4 lines and the BD-11 accommodates 12 lines. Like Switchboards BD-71 and BD-72, these boards are portable, monocord, magneto-telephone switchboards used primarily in field wire systems. They differ from the BD-71 and BD-72 in that each board is equipped with an operator's cord in addition to the line and trunk cords, and there are no talk-listen or ring keys. No operator's telephone is issued with the BD-9 and BD-11, but any field telephone may be used for this purpose. Operation of the BD-9 and BD-11 is comparable to operation of the BD-71 and BD-72, except that the magneto of the operator's telephone is used to ring from the board; there are no keys to be operated; and the operator's cord is used for both ringing and answering. Operation of the BD-9 and BD-11 is explained in appendix I of FM 24-5, Signal Communication. The following fundamental procedure is prescribed for these switchboards:

a. Local Call. An incoming call is indicated by the falling of the calling party's drop-shutter. Insert the operator's plug into the calling party's jack.

Operator: "Dexter operator."

Calling party: "Dexter one one."

Operator: "Dexter one one."

Remove the operator's plug from the calling party's jack and insert it in the called party's jack. Ring the called party by turning the handle of the hand generator on the operator's telephone, and insert the called party's plug into the calling party's jack. The operator's plug may be left in the called party's jack until the conversation has actually begun, or until another call is received. If it is necessary to answer another call before the first connection has been properly supervised, do not restore the shutter. Complete the other connection, then finish supervising the first call, and if it is completed, restore the shutter.

b. Supervision. When the conversation is completed and either party rings off, the called party's drop-shutter will fall. Insert the operator's plug into the called party's jack and challenge:

Operator: "Have you finished?"
If there is no response, repeat:
Operator: "Have you finished?"
If no response to the second challenge is received, take down the connection and restore the drop-shutter.

37. SWITCHBOARD SB-5/PT. Switchboard SB-5/PT is a 6-line, portable, magneto-telephone switchboard for use primarily in field wire systems. It weighs only 12 pounds and for that reason is especially valuable for jungle and mountain operations. This switchboard is similar to the BD-9 and BD-11 in that it has an operator's cord in addition to the line and trunk circuit cords, it has no talk-listen or ring keys, and it has no operator's telephone. A Telephone EE-8 may be used as the operator's telephone, and the magneto of this telephone will be used for ringing. The operator's cord is terminated in a red plug to distinguish it from the line and trunk cords, which have black plugs. Switchboard SB-5/PT differs from the BD-9 and BD-11 in that each line and trunk circuit includes both a ring jack and a talk jack, instead of one common jack. Operation of the SB-5/PT, which is com-

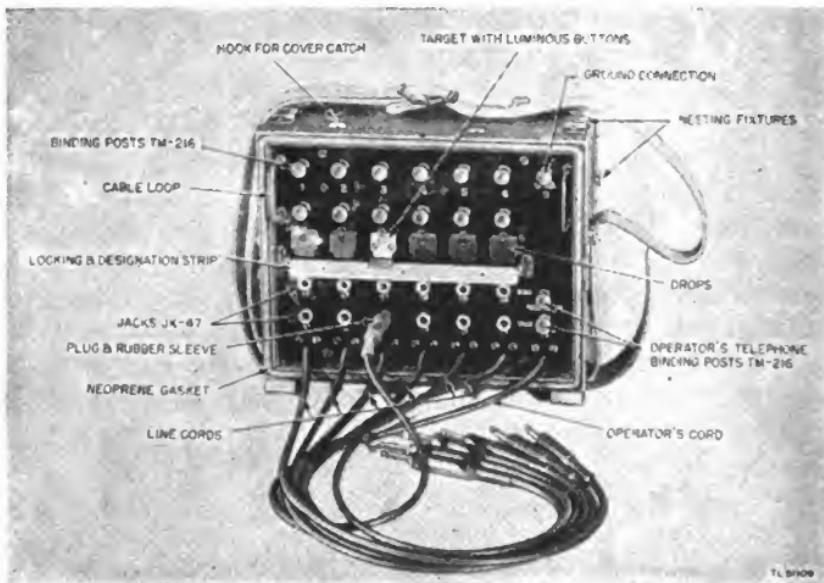


Figure 2. Switchboard SB-5/PT.

parable to operation of the BD-9 and BD-11 is explained fully in TM 11-2016, Switchboard SB-5/PT. The following fundamental operating procedure is taken from that manual:

a. Local Call. An incoming call is indicated by the falling of the calling party's drop-shutter. Insert the operator's plug into the calling party's *talk* jack.

Operator: "Dexter operator."

Calling party: "Dexter six."

Operator: "Dexter six."

Plug the operator's cord into the called party's *ring* jack, turn the magneto handle of the operator's telephone, plug the calling party's cord into the called party's *talk* jack, return the operator's plug to the calling party's *talk* jack, and supervise until the call is completed. If it is necessary to ring again, the operator's plug must be shifted from the calling party's *talk* jack to the called party's *ring* jack. This operation breaks the connection between the called and calling parties, and the operator's plug must be removed from the called party's *ring* jack before conversation can start. When the called party answers, restore the calling party's line drop and remove the operator's plug.

b. Supervisory Signal—Ring-off. When the conversation is completed and either party rings off, the calling party's drop-shutter will fall. Insert the operator's plug into the calling party's *talk* jack and challenge:

Operator: "Have you finished?"

If there is no response, repeat:

Operator: "Have you finished?"

If no response to the second challenge is received, remove the calling party's plug from the called party's *talk* jack and the operator's plug from the calling party's *talk* jack and restore the calling party's drop-shutter.

CHAPTER 4

MULTICORD SWITCHBOARD OPERATING PROCEDURE

Section I. PROCEDURE COMMON TO ALL MULTI-CORD SWITCHBOARDS

38. GENERAL. The operation of multicord switchboards differs slightly from that of monocord boards, but the procedure used is essentially similar. Certain operations and practices are applicable to multicord switchboards, but not to monocord boards. These operations and practices are explained in the following paragraphs.

39. ROTATION OF CORDS. On multicord switchboards, use the cords in rotation from left to right. This facilitates supervision of connections and helps reduce maintenance by giving each cord the same amount of use. After reaching the end of the row, begin again at the left. Disconnected cord pairs should not be used until they are again reached in rotation. The first two cord pairs on the left may be reserved for emergency calls. On multi-position installations the first and last two pairs of cords may be reserved for long reaches to the left and right and for cord passing.

40. KEY SLEEVES. a. Two or three key sleeves or collars may be provided at each position to help keep track of calls. These should be slipped over the keys associated with the cord circuits to be used next under the rotation system. Move a sleeve only when the called party on that cord has answered the telephone, or when the call is abandoned. Then place the

sleeve over the key for the next idle cord pair which has no sleeve. The use of sleeves in this manner will help the operator to:

- (1) Determine whether the called party has answered.
- (2) Provide supplementary rings, progress reports, and other aids in completing the call.
- (3) Determine which lighted supervisory lamps mean incomPLETED calls, and which means calls on which the conversation is finished.
- (4) Handle several calls simultaneously, each in a different stage of progress.

b. The switchboard may be equipped with two-color sleeves. In this case, whenever it is necessary to ring a party line in a manner other than that used for direct lines, the operator will invert the sleeve, bringing the other color to the top. The operator may be instructed to use these colored sleeves to indicate other unusual conditions at his switchboard; if so, he will receive special instructions.

41. PASSING OF CORDS. On some multi-position switchboards, passing of cords is practiced. In this case, two cord pairs on the extreme left and two cord pairs on the extreme right of each position are reserved for passing. The remaining cords are used as outlined in paragraph 39.

a. Passing of cords requires close cooperation and coordination between adjacent operators, but when used properly it speeds service and helps to distribute the work evenly. It is used, for example, when Operator A is extremely busy and has line or trunk signals waiting to be answered which his neighbor, Operator B, cannot reach. In this case, Operator B passes Operator A an answering cord from one of the reserved pairs near Operator A's position, to plug into the jack of the waiting signal. Then Operator B handles the call as though he himself had plugged into the calling line.

b. When Operator B receives a disconnect signal on this cord and determines that the connection should be taken down, he slackens and then tightens the cord as a signal to Operator A to remove the plug from the jack. When Operator A has identified the plug, it should be checked by Operator

slackening and tightening the cord again. Operator A should then remove the plug and Operator B will recover the cord.

c. When Operator B is too busy to answer a signal, he should call for a passed cord by holding out his hand to Operator A, near the end of the row of cords on Operator A's position. It is not advisable for Operator B to pick up the cord himself, since his action may not be noticed and the call might not receive attention.

42. DIALING. Some Army-designed switchboards are provided with a special cord for dialing, and each dial trunk on such boards has two jacks, one for the regular cord and one for the dial cord. To call on a dial trunk, first plug the calling cord in the line jack, and listen for the dial tone. Then plug the dial cord into the dial jack and dial the number. When the last digit has been dialed, wait at least two seconds to allow time for the dial mechanism at the central office to function, remove the dial cord, and listen for the ringing or busy tone. As long as the dial cord remains in its jack it is impossible to talk or listen on the circuit.

a. On some switchboards used by the Army there is no dialing cord, but it is possible to dial with the talk-ring key moved to the talk position.

b. In dialing, always move the dial until the finger strikes the finger stop. Then release the dial, allowing it to return to the normal position. Do not try to speed it up or to slow it down. Do not use a pencil or other tool to operate the dial, since this may result in wrong numbers or in damaged dials.

Section II. MULTICORD SWITCHBOARDS

43. GENERAL. Multicord switchboards in common use by the Army include the BD-14; the BD-80, component of Telephone Central Office Set TC-1; the BD-89, component of the TC-2; the BD-91, component of the TC-12; the BD-96, component of the TC-4; and the BD-110, component of the TC-10. For convenience in discussing procedure, these switchboards are arranged in the following paragraphs according to similarity of operation, instead of in numerical order.

44. SWITCHBOARDS BD-91 AND BD-96. Switchboards BD-91 and BD-96 are complete, transportable, single-position telephone switchboards serving magneto lines and trunks. Trunk circuits are provided for connection to common battery lines of either manual or automatic central offices. Drop signals are associated with the lines and trunks for indicating incoming calls, and with each cord circuit for supervisory signals. The BD-91 has a capacity of 20 lines, 4 trunks, and 8 cord circuits, and the BD-96 has a capacity of 40 lines, 4 trunks, and 12 cord circuits. The following operating procedure is applicable to both switchboards:

a. Local Call. A drop-shutter falls. The operator moves the proper talk-ring key to the talk position and simultaneously inserts the plug of the answering (rear) cord into the calling party's jack.

Operator: "Dexter Operator."

He picks up the associated calling (front) cord in his right hand.

Calling party: "Dexter six."

Operator: "Dexter six."

The operator plugs the calling cord into the Dexter six jack and operates the talk-ring key to the ring position. If no other source of ringing current is provided, he operates the hand generator. He then returns the key to the talk position until he hears conversation begin on the line. There must never be two keys in the talk position at the same time, since this would result in crosstalk.

b. Incoming Common Battery Trunk to Local Call. A common battery trunk drop-shutter falls. The operator moves the proper talk-ring key to the talk position and plugs the answering cord into the line (L) jack of the trunk circuit.

Operator: "Dexter operator."

He picks up the associated calling cord in his right hand.

Cactus operator: "Dexter six."

Dexter operator: "Dexter six."

The Dexter operator plugs the calling cord in the Dexter six jack, rings, and supervises. A call connected through a common battery trunk circuit must be supervised more frequently than a local call, and the operator must be careful not to break the connection by removing the plug from the trunk jack

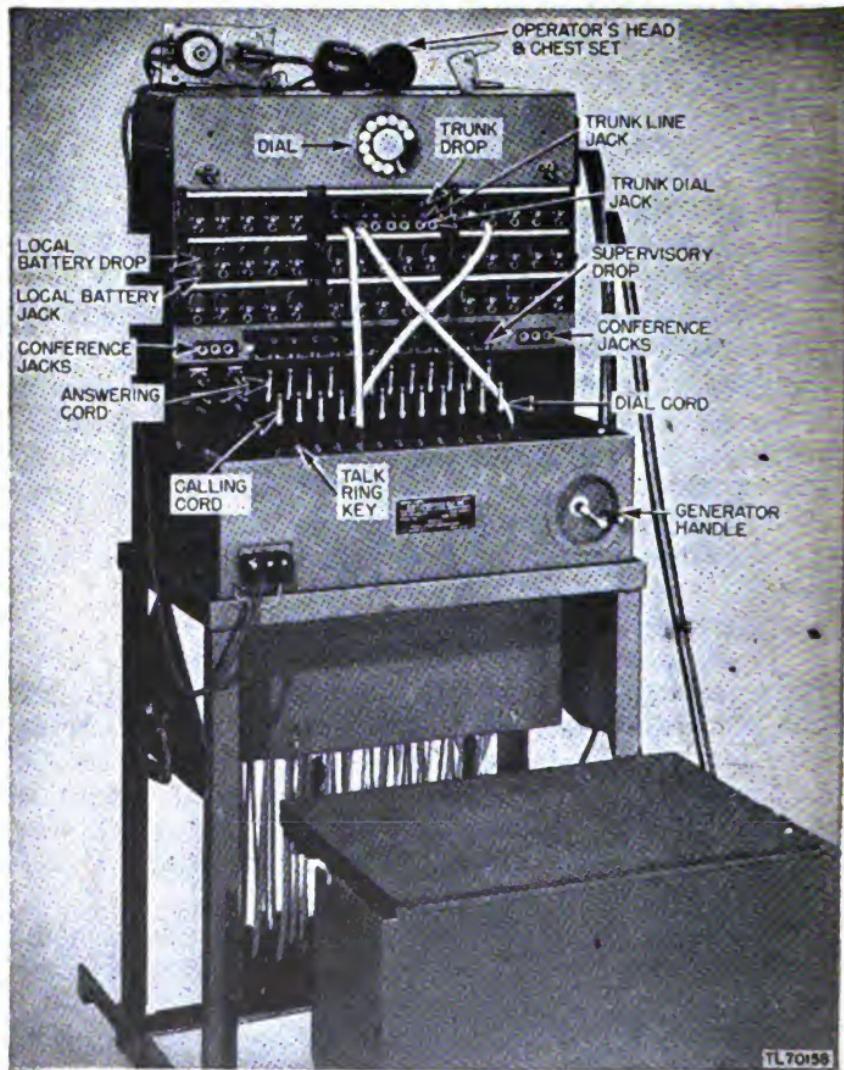


Figure 3. Switchboard BD-96.

c. Outgoing Local Battery Trunk Call. A drop-shutter falls and the operator answers.

Operator: "Dexter operator."

Calling party: "Ambrose six."

Operator: "Ambrose six."

The operator consults his traffic diagram or route bulletin,

selects the proper trunk, plugs in the calling cord, rings, then returns the key to the talk position.

Cactus operator: "Cactus operator."

Dexter operator: "Ambrose six."

Cactus operator: "Ambrose six."

The Dexter operator supervises at frequent intervals to make sure that the call is completed properly. The Cactus operator plugs the proper calling cord into the jack of a trunk to Ambrose, rings, and supervises.

Ambrose operator: "Ambrose operator."

Cactus operator: "Ambrose six."

Ambrose operator: "Ambrose six."

The Cactus operator returns his key to the neutral position while the Ambrose operator completes the call in the normal manner.

d. Outgoing Common Battery Trunk Call Through a Manual Exchange. A drop-shutter falls and the operator answers.

Operator: "Dexter operator."

Calling party: "Bomber six."

Operator: "Bomber six."

The operator must use one of the common battery trunks to reach Bomber. He plugs the calling cord into the line jack of the proper trunk, but does not ring, since the insertion of the plug into the jack automatically lights a lamp signal at the Bomber switchboard.

Bomber operator: "Bomber operator."

Dexter operator: "Bomber six."

Bomber operator: "Bomber six."

The Dexter operator supervises at frequent intervals until the called party answers.

e. Outgoing Common Battery Trunk Call Through a Dial Exchange. A drop-shutter falls and the operator answers.

Operator: "Dexter operator."

Calling party: "Canal one one."

Operator: "Canal one one."

The operator consults his traffic diagram or route bulletin and finds that he can reach Canal through Argus, which is a dial exchange to which he has a dial trunk circuit. He inserts the

calling cord into the line jack of the proper trunk and listens for dial tone. He then plugs the dial cord into the dial (D) jack of the same trunk and dials 357, Canal's number. Before removing the dial cord from the jack to listen, the operator waits at least two seconds to allow time for the switching mechanism at the Argus central office to operate. Then he listens for the ring or the busy signal. Unless the trunk to Canal from Argus is busy, the Canal operator will answer:

Canal operator: "Canal operator."

Dexter operator: "Canal one one."

Canal operator: "Canal one one."

The Dexter operator supervises at frequent intervals until the called party answers.

f. **Supervision.** After a connection has been established, supervise frequently to determine whether it is still in use. If nothing is heard, challenge:

Operator: "Have you finished?"

If there is no response, repeat:

Operator: "Have you finished?"

If there is no response to the second challenge, trace the cords by hand and take down the connection. If one of the connected lines is a trunk, and the distant operator is heard challenging, report:

Operator: "Clear to Dexter."

If the distant operator is not heard, ring off on the trunk and, when he answers, report:

Operator: "Clear to Dexter."

g. **Supervisory Signal—Ring-off.** Supervisory signals are indicated by the falling of the supervisory drop-shutter associated with the cord pair connecting the parties. Upon receiving a supervisory signal, the operator moves the talk-ring key to the talk position and challenges:

Operator: "Have you finished?"

If there is no response, follow the procedure explained in paragraph f.

h. **Supervisory Signal—Recall—New Number Wanted.** A supervisory drop falls and the operator challenges:

Operator: "Have you finished?"

Calling party: "I want Dexter two."

Operator: "What number is calling, please?"

Calling party: "Dexter three."

Operator: "Dexter three calling Dexter two."

If an answer cord is plugged into the Dexter three jack, the operator merely disconnects the calling cord from the old connection and uses it to call Dexter two. However, if a calling cord is plugged into the Dexter three jack, the operator must interchange the answering cord for the calling cord or use another pair to make the connection.

i. Conference Call. A drop-shutter falls and the operator answers:

Operator: "Dexter operator."

Calling party: "I want a conference call with Dexter two and Dexter three."

As the called parties are designated, the operator writes down the numbers.

Operator: "Dexter two and Dexter three. Who is calling, please?"

Calling party: "The Chief of Staff."

Operator: "I will call you back."

Calling party: "No, I will wait."

The operator will interchange the answering cord in the calling party's jack for the associated calling cord and return the talk-ring key to the neutral position. He will then call Dexter two.

Dexter two: "Dexter two, G-2 speaking"

Operator: "Conference call from the Chief of Staff; one moment, please."

He will plug the answering cord of that cord pair into a conference jack and return the key to normal, then call Dexter three.

Dexter three: "Dexter three, G-3 speaking."

Operator: "Conference call from the Chief of Staff; one moment, please."

The operator will plug the answering cord of that cord pair into a conference jack and return the key to normal, then return to the calling party, depress the key to the talk position and plug the answering cord into a conference jack.

Operator: "On your conference call, we are ready. Go ahead, please."

If he has been unable to reach one or more of the called parties, he will report that fact and receive instructions for further action. He will listen, following his report, and if he does not hear conversation begin, he will ring the calling party. If the calling party had preferred to hang up while waiting for completion of the conference connections, the operator would call him.

Calling party: "Dexter five, Chief of Staff."

Operator: "On your conference call, we are ready; go ahead, please."

45. SWITCHBOARD BD-14. Like Switchboards BD-91 and BD-96, the BD-14 is a complete, transportable, single-position telephone switchboard used for serving magneto line and trunk traffic.

This board has a capacity of 40 line or trunk circuits and eight cord circuits. Drop signals are associated with the line and trunk circuits for indicating incoming calls and with each cord circuit for indicating supervisory signals. The BD-14 differs from the two multicord switchboards already discussed in that it has no equipment for dialing; it has an extra row of keys, called *ring-back* keys, which enable the operator to ring on the answering as well as the calling cords; and it has no conference jacks or other devices for making conference connections. Operating procedure for the BD-14 is explained in TM 11-331, Switchboard BD-14. This procedure is comparable to that explained in paragraph 44 for Switchboards BD-91 and BD-96, except that when calling a new number after a recall by the called party on an original connection, the operator need not substitute the calling cord for the answering cord, since he can ring on the answering cord by means of the *ring-back* key.

46. SWITCHBOARD BD-89. Switchboard BD-89 is a complete, transportable, single-position telephone switchboard serving both magneto and common battery lines. Lamp signals are provided for the common battery lines and the cord circuits, and drop signals are provided for the magneto lines, with magneto recall lamps associated with each cord. This switchboard has a capacity of 37 common battery line cir-

cuits, 20 magneto line circuits, 13 universal cord circuits, 2 trunk circuits for connection to a common battery manual central office, and one dial trunk circuit. Operation of this switchboard is comparable to operation of Switchboards BD-91 and BD-96. Detailed operating procedure for this switchboard is explained in TM 11-340, Telephone Central Office Set TC-2. The following fundamental procedure is taken from that manual:

a. Local Call—Local Battery Lines. An incoming signal

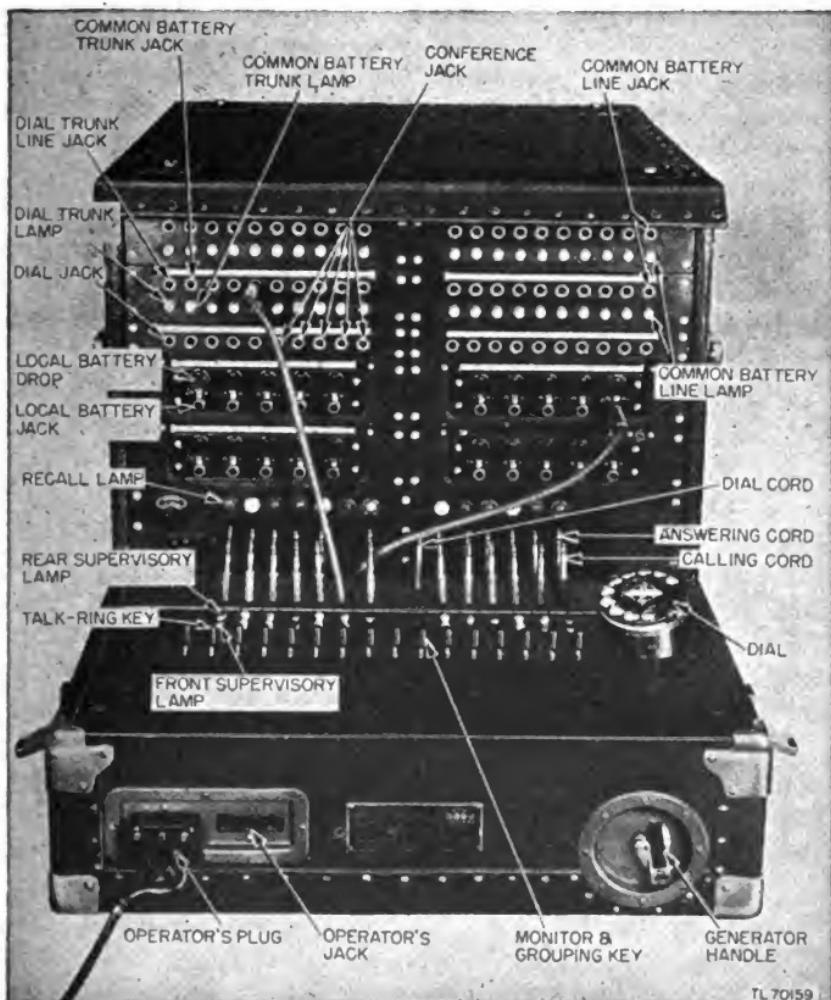


Figure 1. Switchboard BD-89

is indicated by the falling of a drop-shutter. The operator moves the talk-ring key associated with the proper cord circuit to the talk position, and inserts the plug of the answering (rear) cord into the calling party's jack.

Operator: "Dexter operator."

He picks up the associated calling (front) cord.

Calling party: "Dexter two eight."

Operator: "Dexter two eight."

The operator plugs the calling cord into the Dexter two eight jack and operates the talk-ring key to the ringing position. If power for ringing is not available, he also cranks the hand generator. He then returns the key to the talk position until he hears conversation begin on the line. Whenever the called party is on a local battery line, the operator must listen to supervise the connection.

b. Local Call—Common Battery Lines. An incoming call is indicated by the lighting of a line lamp. The operator moves the talk-ring key associated with the proper cord circuit to the talk position and plugs the answering cord into the calling party's jack.

Operator: "Dexter operator."

He picks up the associated calling cord.

Calling party: "Dexter six."

Operator: "Dexter six."

The operator plugs the calling cord into the Dexter six jack and rings, then returns the key to the normal (neutral) position. Whenever the *called* party is on a common battery line, the operator need not listen to supervise; the supervisory lamp associated with the calling cord will be extinguished when the phone is answered.

c. Incoming Common Battery Trunk to Local Call. A common battery trunk lamp lights. The operator moves the proper talk-ring key to the talk position and plugs the answering cord into the line (L) jack of the trunk circuit.

Operator: "Dexter operator."

He picks up the associated calling cord in his right hand.

Cactus operator: "Dexter six."

Dexter operator: "Dexter six."

The Dexter operator plugs the calling cord into the Dexter

six jack and rings. If the called party is on a local battery circuit, the operator moves the talk-ring key to the talk position and listens to supervise the call. If the called party is on a common battery circuit, the operator moves the key to the neutral position and supervises by means of the supervisory lamp.

d. Outgoing Trunk Call Through a Manual Exchange.
A local battery drop-shutter falls or a common battery line lamp lights and the operator answers.

Operator: "Dexter operator."

Calling party: "Bomber six."

Operator: "Bomber six."

The operator plugs the calling cord into the line jack of the proper trunk, but does not ring, since the insertion of the plug into the jack automatically lights a lamp signal at the Bomber switchboard.

Bomber operator: "Bomber operator."

Dexter operator: "Bomber six."

Bomber operator: "Bomber six."

The Dexter operator supervises at frequent intervals until the called party answers.

e. Outgoing Trunk Call Through a Dial Exchange.
An incoming call is received and the operator answers.

Operator: "Dexter operator."

Calling party: "Canal one one."

Operator: "Canal one one."

The operator consults his traffic diagram or route bulletin and finds that he can reach Canal through Argus, which is a dial exchange to which he has a dial trunk circuit. He inserts the calling cord into the line jack of the proper trunk and listens for dial tone. He then plugs the dial cord into the dial jack of the same trunk and dials 357, Canal's number. Before removing the dial cord from the jack to listen, the operator waits at least 2 seconds to allow time for the switching mechanism at the Argus central office to operate. Then he listens for the ring or the busy signal. Unless the trunk to Canal from Argus is busy, the Canal operator will answer.

Canal operator: "Canal operator."

Dexter operator: "Canal one one."

Canal operator: "Canal one one."

The Dexter operator supervises at frequent intervals until the called party answers.

f. **Supervisory Signal—Disconnect—Common Battery Lines.** When both common battery supervisory lamps are lighted, it means that both parties have hung up. The operator will not challenge, but will trace the cords from the key-shelf by hand and disconnect.

g. **Supervisory Signal—Ring-off—Local Battery Lines.** When either cord is connected to a local battery line and the subscriber rings off, the local battery recall lamp associated with the cord circuit in use will light during the ringing period. Since the lamp will stay lighted only while the subscriber is turning the generator crank, the operator must be alert not to miss this signal. The operator moves the associated talk-ring key to the talk position and challenges:

Operator: "Have you finished?"

If he hears nothing, he will repeat:

Operator: "Have you finished?"

If he receives no answer to this second challenge, he will disconnect. If one of the circuits involved is a trunk, he will clear it before disconnecting.

h. **Supervisory Signal—Common Battery Recall—New Number Wanted.** When one of the common battery supervisory lamps begins to flash on and off, the party connected to the associated cord is signalling the operator by moving the receiver hook up and down. The operator moves the talk-ring key to the talk position.

Operator: "Dexter operator."

Calling party: "I want Dexter three."

Operator: "Dexter three."

If the rear lamp was flashing, the operator disconnects the calling cord from the old connection and uses it to complete the new connection. If the front lamp was flashing, the calling cord must be interchanged for the answering cord before the connection can be made, or a second calling cord must be used to call Dexter three.

i. **Supervisory Signal — Local Battery Recall — New Number Wanted.** If both cords are connected to local battery lines and a local battery recall lamp lights, the operator will challenge:

Operator: "Have you finished?"

Calling party: "I want Dexter two eight."

Operator: "What number is calling, please?"

Calling party: "Dexter one zero four."

Operator: "Dexter one zero four calling Dexter two eight."

The operator takes down the old connection and completes the new call.

j. **Use of Monitoring Key.** To listen-in on a connection without causing any perceptible transmission loss, as on a long distance call where the line loss already is high, use the monitoring key (labeled MON) in conjunction with the appropriate talk-ring key. First operate the monitoring key, and then move the talk-listen key to the talk position. The operator cannot talk on the connection being monitored, but he can listen to determine whether or not it is in use.

k. **Conference Call.** Conference procedure for this switchboard is similar to that explained in paragraph 44i.

47. SWITCHBOARDS BD-80 AND BD-110. Switchboards BD-80 and BD-110 are single-position switchboards serving magneto and common battery lines, common battery manual trunks, and dial trunks. They are equipped with multiple jacks for use when two or more switchboards are operated as one installation. Lamp signals are provided for signaling on the common battery lines and trunks and for supervision on cord circuits. Drops are provided for the magneto lines, and magneto recall lamps are associated with each cord circuit. Construction of these switchboards permits their use for installations of from one to six positions. Both of these switchboards are equipped with 30 local battery signals and answering jacks, 60 local battery multiple jacks, 60 common battery signals and answering jacks, 120 common battery multiple jacks, 10 conference jacks (comprising one conference circuit), 15 universal cord circuits, an operator's telephone circuit with grouping key, a dial, and a dial cord circuit. In addition, Switchboard BD-80 is equipped with three common battery manual trunk signals and answering jacks; six common battery manual trunk multiple jacks; three dial trunk signals and answering jacks; and six dial trunk multiple jacks; while

Switchboard BD-110 is equipped with four common battery universal trunk signals, answering jacks, and dial jacks; and eight common battery universal trunk multiple jacks and multiple dial jacks. Operating procedure for these switchboards is similar to the procedure for Switchboard BD-89, as explained in paragraph 44. For details of operating procedure, see TM 11-335, Telephone Central Office Set TC-1; and TM 11-338, Telephone Central Office Set TC-10. The following fundamentals of operation are taken from those manuals:

a. **Local Call.** An incoming signal is indicated by the falling of the drop-shutter associated with a local battery answering jack or the lighting of the line lamp associated with a common battery answering jack. The operator moves the proper talk-ring key to the talk position and inserts the plug of the associated answering cord into the calling party's jack.

Operator: "Dexter operator."

He picks up the associated calling cord.

Calling party: "Dexter three nine."

Operator: "Dexter three nine."

Since every line and trunk coming into the switchboard is represented by a multiple jack at several different positions, the operator can complete the connection to Dexter 39 at his own or an adjoining position. However, before plugging the calling cord into the Dexter 39 jack he must make a busy test to make certain that an operator at one of the other positions has not made a connection involving that circuit. Correct procedure for making a busy test is explained in paragraph 16. When the plug has been inserted in the proper jack, the talk-ring key is moved to the ringing position. If the called party is on a local battery line, the operator must move the talk-ring key to the talk position to supervise after ringing. If the party is on a common battery line, the key is moved to the neutral position and supervision is effected by means of the supervisory lamp associated with the calling cord.

b. **Trunk Calls.** Trunk call procedure for these two switchboards is the same as that for Switchboard BD-89, as described in paragraph 46c, d, and e, except that a busy test must be made before a calling cord is plugged into a jack, and multiple trunk jacks may be used.

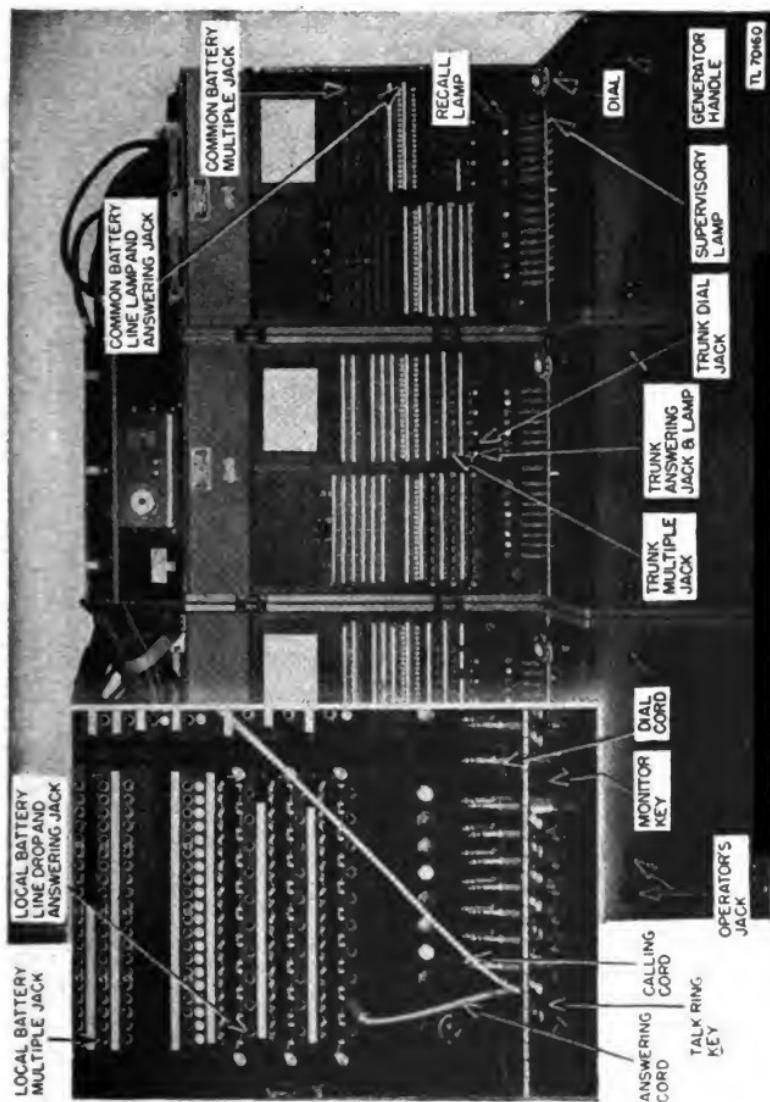


Figure 5. Bank of three Switchboards BD-110.

c. **Supervisory Signals.** Supervisory signals for these switchboards are the same as those for Switchboard BD-89, as described in paragraph 46f, g, h, and i.

d. **Monitoring Key.** Operation of the monitoring keys on these switchboards is identical to the operation explained in paragraph 44j.

e. **Conference Call.** Conference call procedure on these boards is identical with the procedure explained in paragraph 44i, except that multiple jacks may be used and busy tests must be made before plugging into such jacks.

CHAPTER 5

LONG DISTANCE PROCEDURE

48. GENERAL. The following general procedure is presented as a guide for the operation of long distance switchboards. Long distance procedure for switchboards which serve primarily as local switchboards is explained in chapters 3, 4, and 5. Specific long distance procedure for service commands, theaters of operations, and comparable headquarters normally will be prescribed by the signal officers of such headquarters. Toll and long distance procedure for installations within the continental limits of the United States is prescribed in section III of War Department Circular No. 222, 21 Sep 43. The following fundamentals are standard throughout the Army:

a. Basic Operating Phraseology. At a long distance switchboard, answer calls from local switchboards within the particular region served by the switchboard by saying: "Long distance." Answer calls from switchboards outside this region by saying: "(Name of switchboard) operator." When a calling party of another operator has requested a number to be called, acknowledge the request by repeating the number to be called, as: "Cactus one zero seven."

b. Basic Operating Procedure. A long distance operator may take calls from a local operator or from the calling party. In the first instance, the local operator who answers the calling party will obtain all necessary information on the call and pass this to the long distance operator. In the alternate instance, the calling party is permitted to place his call directly with the long distance operator. In either case, the long distance operator is responsible for routing the call. Consult the

traffic diagram or route bulletin for the most efficient route to the desired exchange. If several trunks are available to the next intermediate switchboard, make a busy test if necessary on each, working from left to right, until an idle trunk is found. If all lines to one of the intermediate switchboards are busy, take the first alternate route. If there is no alternate route, inform the calling party that the switchboard of the called party is busy, since the subscriber might not understand a reference to an intermediate switchboard. At many long distance switchboards, when a call can not be completed because of busy trunks, information essential to completion of the call is recorded on a long distance ticket (fig. 6), the calling party is told to hang up, and the call is completed later. In such a case, the calling party is called back when the trunk connection to the called party's switchboard has been made. If, however, there is an idle trunk to the desired switchboard immediately available, follow the prescribed trunk call procedure for the particular type of switchboard involved. When the distant operator answers, pass the call to him by repeating the desired number in full. Continue to supervise the call until the called party has answered. Completion of a connection is the responsibility of the long distance operator at the point of origin.

c. **Supervision.** After conversation has started on the long distance connection, the operator must continue to supervise closely in order to disconnect promptly when the conversation is terminated. Failure to disconnect promptly on a long distance call not only denies other subscribers and operators the use of the locals and trunks involved, but also wastes the time of the other operators concerned. On most multicord switchboards supervision is accomplished by means of supervisory and recall lamps and the operator does not have to listen on the connection. On boards not equipped with such lamps, the operator must listen. If a monitoring key is provided on the switchboard, use this key to reduce transmission loss while listening. If no conversation is heard, challenge as usual. On a local battery trunk, clear the line to the distant operator before disconnecting. On a common battery trunk, if the answering cord supervisory lamp is lighted, the operator may cut without challenging or clearing the trunk.

Figure 6. Long distance and toll ticket.

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49. DELAYED CALLS. a. When there is a delay of more than 10 minutes in the completion of calls between certain switchboards, the chief operators of the two switchboards may, by agreement, post delay on the trunks involved. This means that when calls come in to be routed over these trunks, the operators receiving the calls will record pertinent information on each call, and the calling parties will hang up, to be called back when the long distance connection is completed. The operator will say: "(Name of called switchboard) is busy. I will record your call and call you. Your name and number, please?" Details of the call, including the filing time, will be recorded on a long distance ticket (fig. 6). At some large headquarters, where there are many delayed long distance calls, the calling party may be referred to a special recording operator, who will enter on the ticket such information as the filing time; the calling and called parties' names, telephone numbers, and locations; and the first and alternate routes to the desired switchboard. The recording operator may also number each ticket and inform the calling parties of their ticket numbers to facilitate later reference to the calls. The tickets, whether filled in by the recording operator or the regular long distance operator, will normally be turned over to a special operator who will see that subsequent attempts are made to complete the calls, in the order in which they were received. The chief operator sometimes assumes this function. When conditions warrant, the chief operator directs a return to normal operation on the trunks on which delay has been posted. Usually this is done when there are no waiting calls except those which have been attempted and cannot be completed.

b. An operator attempting to complete a delayed call first rings the distant operator and gives the number of the called party, as on an ordinary trunk call. While the distant operator is ringing the called party, the first operator rings the calling party and says: "One moment, please. We are ringing (number of called party)." If the called party is heard answering before the calling party has answered, say: "One moment, please. I have a long distance call for you." If the called party fails to answer after the calling party has responded, say: "(Number of called party) does not answer." When an at-

tempt is made on a delayed call and the connection is not completed, enter on the back of the ticket the attempt time and the reason for the failure to complete the call. The following abbreviations may be used in noting the reason for failure: BY, busy; DA, don't answer; NC, no circuit; OD, out of order; WC, will call; U, expected.

CHAPTER 6

MISCELLANEOUS

50. DIRECTORY SERVICE. Most Army switchboards will use the standard Army telephone directory. Large switchboards will require special directories prepared under the direction of the signal officer. At some large central offices, an information service will be provided. Either the directory itself or directory information in some special form will be located at each operator's position at the switchboard. When answering calls not placed by number, consult the directory to learn the correct number. If the called party is not listed in the directory, refer the call to the chief operator for further attention.

51. ROUTE BULLETIN. At switchboards serving large installations, the usual traffic diagram often becomes very complex and its use may result in attempts to establish built-up trunks with so great a transmission loss that communication is impossible. To solve this problem, a route bulletin is prepared based on the traffic diagram maintained by the chief operator (see fig. 7). This bulletin lists alphabetically all other switchboards in the system, giving the first or regular route to each, followed by alternate routes. It is posted on the switchboard so as to be readily available for reference by each operator.

<i>Point</i>	<i>First Route</i>	<i>Alternate Route</i>	<i>Point</i>	<i>First Route</i>
ALLAIN	RABAT	SOUK AHMED-RABAT	SOLO	TROJAN-FAI
AMBROSE	DIRECT	APPLE	SOUK AHMED	DIRECT
APPLE	DIRECT	AMBROSE	SUDDEN	MAGIC
ATLANTA	RABAT-CASABLANCA	GHAMINA-MAYTIME	TROJAN	DIRECT
BLINKER	DIRECT	APPLE	TRYON	RABAT
BOUFAROUK	RABAT	TROJAN-FAIRVIEW-SOLO	UNION	SOU
BRANCH	AMBROSE	APPLE-AMBROSE	VESSEL	
BULLET	BLINKER	APPLE-BLINKER	VIR	
CACTUS	AMBROSE	APPLE-AMBROSE		
CAGOULI	TROJAN-FAIRVIEW	PARADE-LINGER-RUNNER		
CAMERA	TROJAN	BLINKER-TROJAN		
CAPTOR	DIRECT	AMBROSE		
CASABLANCA	RABAT	SOUK AHMED-RABAT		
DAGWOOD	DIEDI	SOUK AHMED-UNION		
DAMPER	SOUK AHMED	DJEDI-SOUK AHMED		
DANDY	DIRECT	RABAT		
DELTA	CAPTOR	APPLE-AMBROSE		
DEXTER	AMBROSE	BLINKER-APPLE		
DJEDI	DIRECT	MARSHALL-VESSE		
FAIRVIEW	TROJAN	RABAT-BOUFAIR		
FIRST ARMY ADV	DIRECT	APPLE		
FIRST ARMY R	SOUK AHMED	BO		
GARDEN	DIRECT			
GHAMINA				
HEDJAZ				

Figure 7. Typical route bulletin.

52. PROPER BEHAVIOR. The room, truck, or dugout in which a switchboard is located is a place of business. Do not encourage anyone to loiter in it. Loud talking or boisterous actions distract operators' attention from their duties, and lower the quality of service. Do not transact personal business or make personal calls while at the switchboard.

53. CARE OF EQUIPMENT. The operator is responsible for the care of the individual operating equipment which has been issued to him. Keep the mouthpiece clean and dry. Store the equipment neatly in the designated place when it is not in use. Do not attempt to make unauthorized repairs on equipment in the switchboard room. If trouble develops, report it to the chief operator or the wire chief. Do not play with keys, jacks, dials, or cords during idle periods. Do not poke at equipment with pencils.

54. CARE OF SWITCHBOARD ROOM. Bring nothing into the switchboard room which is not essential to the operation of the switchboard, unless specifically authorized to do so. In particular, keep the key shelf clear of all unnecessary papers and other articles. Care must be exercised to avoid covering supervisory lamps. Keep the room clean and neat at all times.

55. FAULTY OPERATING PRACTICES. Common faults which should be avoided in operating a switchboard are summarized below:

a. **Plug-in.** This occurs when an operator plugs into a line to answer a call, and then allows an interval of time to elapse before answering. Plug-ins lead the called party to believe his call has gone astray. This may be avoided by operating the listening key before plugging in.

b. **Slow Answers.** Speed of answer is measured from the time a new call appears on the board to the time it is answered. An answer is considered slow when the calling party has to wait more than 10 seconds to place his call.

c. **Unsatisfactory Answering Phrases.** An unsatisfactory answering phrase leaves the calling party in doubt as to whom he is talking. Never answer with simply "Yes," or other incomplete phrases. Use only the prescribed answering phrase.

d. Failure to Acknowledge a Call. This leaves the calling party in doubt as to whether his call has been understood and is receiving attention. Always acknowledge by repeating the called number.

e. Cutting Out Too Quickly. If an operator leaves a connection before the calling party has had an opportunity to respond, he gives the impression of indifference or even discourtesy. Always wait a moment before operating your key.

f. Inattention. Inattention to a caller's request implies a lack of interest. It results in needless, and often annoying, requests for repetitions, and leads to errors. Be prepared to render quick, attentive service before attempting to answer the call.

g. Delay in Completing Call. When an operator receives an order, and does not attempt to complete the call immediately, the calling party is left without knowledge of the state of his call. Make an immediate attempt to complete every call, and report the reason for any delay encountered.

h. Incorrect Passing of Long Distance Calls. When a long distance call is passed incorrectly, completion of the call is delayed. This usually results from failure to have all necessary information ready for the long distance operator. Be prepared with full data recorded on the long distance ticket.

i. Failure to Give Progress Reports. Progress reports assure the calling party that everything possible is being done to obtain the connection he desires. They encourage him to wait, and improve his opinion of the service rendered. Failure to make such reports results in abandoned calls and dissatisfaction. Give progress reports every 60 seconds.

j. Inattention to Disconnect Signals. This ties up circuits unnecessarily and causes confusion on the part of the user when he cannot reach the operator. Keep a constant watch for disconnect signals, particularly on local battery lines and ring-down trunks.

56. CHIEF OPERATOR. Specific duties and responsibilities of the chief operator will be prescribed by the signal officer. Normally his primary function will be to direct, assist, and instruct the operators in the performance of their duties. He

prepares or supervises the preparation of traffic diagrams and route bulletins, and supervises the maintenance of the station log. He keeps records of tests on lines, reports all circuit failures, and posts delay on trunks when necessary. The chief operator prepares duty shift schedules for the operators, instructs new operators in procedure, directs the rerouting of traffic when normal circuits fail, and sees that traffic is handled efficiently and in accordance with prescribed procedure. He must be thoroughly familiar with the construction and operation of the types of switchboards used at his exchange, and may be called on to perform the duties of an operator.

57. SUPERVISORS. Supervisors are assistants to the chief operator and serve to direct, assist, and instruct the operators in the performance of their duties. Normally, the supervisors are operators who perform these supervisory functions in addition to their operating duties. They check the work of other operators for courtesy, efficiency, and conformity with security regulations and prescribed procedure. In the absence of the chief operator, one of the supervisors may be designated to serve as acting chief operator.

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